

San José State University
Department of Computer Science
CS 47, Section 01
Introduction to Computer Systems
Spring 2020

Course and Contact Information

<i>Instructor:</i>	Kaushik Patra
<i>Office Location:</i>	DH 282
<i>Telephone:</i>	(408) 924-5161
<i>Email:</i>	kaushik.patra@sjsu.edu
<i>Office Hours:</i>	Tue 4:30 pm – 5:45 pm
<i>Class Days/Time:</i>	TTH 6:00 pm – 7:15 pm (Sec01)
<i>Classroom:</i>	DH 135
<i>Prerequisites:</i>	CS 46B or CS49J or equivalent (with a grade of "C-" or better)

Course Format

This course uses hybrid style (online + in-class) flipped method. In general students are expected to have computer systems with internet connection. A tool 'MARS' will be used to study assembly programming concept. The materials and lecture videos are uploaded in Canvas prior to class. Students are required to review the lecture video and note before coming to class. During class hour it is expected that students bring their laptop with internet connection to download some program material to work on during class hour if needed. All the homework and assignments are to be uploaded in Canvas.

Course Description

Instruction sets, assembly language and assemblers, linkers and loaders, data representation and manipulation, interrupts, pointers, function calls, argument passing, and basic gate-level digital logic design.

Course Topics:

Computer organization, Number representation, programming a computer, assemblers, linker, loader, MIPS assembly language programming, run time memory stack, interrupt & exceptions, Boolean algebra, integer mathematics, logic gates & logic design.

Course Objectives:

- To get introduced to the organization of a computer system
- To get familiarized with instruction sets and assembly programming
- To experience extensive programming practice that reinforces binary data representation, assembly instructions, addressing modes, and run time stack organization
- To get extensive lab practice using computer simulation.
- To appreciate how the computer hardware supports systems programming and high-level languages

Learning Outcomes and Course Goals

Course Goal:

The course consists of an introduction to computer hardware organization and the hardware/software interface. Programming assignments are used to reinforce concepts of data representation, addressing modes, memory organization, run time stacks, and interfacing with high-level languages.

Course Learning Outcomes (CLO):

Upon successful completion of this course, students should be able to:

- To be familiar with the architectural components of a computer system: CPU (registers, ALU), memory, buses
- To be able to convert between decimal, binary, and hexadecimal notations.
- To work with two's complement integers, floating-point numbers, and character encodings
- To be able to write assembly programs that use load/store, arithmetic, logic, branches, call/return and push/pop instructions.
- To understand the gate-level operations of basic ALU

BS in Computer Science Program Outcomes Supported:

These are the BSCS Program Outcomes supported by this course:

- a) An ability to apply knowledge of computing and mathematics to solve problems.
- b) An ability to analyze a problem, to identify and define the computing requirements appropriate to its solution
- c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- i) An ability to use current techniques, skills, and tools necessary for computing practice.
- j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

Required Texts/Readings

Textbook

COMPUTER ORGANIZATION and DESIGN | Edition: 5
Author: DAVID A. PATTERSON
ISBN:9780124077263
Publication Date:10/10/2013
Publisher:ELSEVIER

Other Readings

LOGIC & COMPUTER DESIGN FUNDAMENTALS
Author: MANO & KIME
ISBN: 9780131989269
Publication Date: 06/15/2007
Publisher: PEARSON

Other technology requirements / equipment / material

You will be **required** to bring a [wireless laptop](#) to all classes.

Course Requirements and Assignments

- Each student is expected to be present, punctual, and prepared at every scheduled class and lab session. It is assumed that the students already have basic knowledge of digital Boolean logic and fundamentals of assembly language machine programming.
- Attendance is **NOT** optional. Individual participation is also required. There will be no make-ups for missed midterm or assignments, unless any special arrangements is made with the instructor beforehand.
- All student **must complete** the *Syllabus agreement* through by **Jan 25, 2020 11:59 pm**. Any one **failed** to do so will be **dropped** from the class. This agreement will be sent to individual email as '**[CS47,01] PreReq-Survey**' from <https://sjsu.qualtrics.com>.
- There will be **8 programming assignments, 6 quizzes, 1 individual project, one midterm and final exam**. All programming assignments and projects should be submitted through Canvas. **No scanned copy** of handwritten solution is allowed. Allowed document type is **PDF** only for written reports.

Project report should contain the following.

- Introduction containing objective.
- Requirement.

- Design and Implementation.
- Testing
- Conclusion
- Make sure to
 1. Include clear diagrams for requirement and design.
 2. Include code snippet to explain implementation.
 3. Include screen shots of testing results.
 4. Upload source code and test program as zip archive.

Project reports are encouraged to be submitted in [IEEE format](#).

[http://www.ieee.org/conferences_events/conferences/publishing/templates.html]

10% of the obtained marks in project will be awarded as extra points in project evaluation if report submitted in proper IEEE format.

LockDown Browser + Webcam Requirement

This course requires the use of LockDown Browser and a webcam for online quizzes. The webcam can be the type that's built into your computer or one that plugs in with a USB cable.

Watch this brief video to get a basic understanding of LockDown Browser and the webcam feature.

<https://www.respondus.com/products/lockdown-browser/student-movie.shtml>

Download Instructions

Download and install LockDown Browser from this link:

<https://download.respondus.com/lockdown/download.php?id=967937270>

Once Installed

- Start LockDown Browser
- Log into to Canvas
- Navigate to the quiz

Note: You won't be able to access a quiz that requires LockDown Browser with a standard web browser. If this is tried, an error message will indicate that the test requires the use of LockDown Browser. Simply start LockDown Browser and navigate back to the exam to continue.

Guidelines

When taking an online quiz, follow these guidelines:

- Ensure you're in a location where you won't be interrupted
- Turn off all other devices (e.g. tablets, phones, second computers) and place them outside of your reach
- Before starting the test, know how much time is available for it, and also that you've allotted sufficient time to complete it
- Clear your desk or workspace of all external materials not permitted - books, papers, other devices
- Remain at your computer for the duration of the test
- If the computer, Wi-Fi, or location is different than what was used previously with the "Webcam Check" and "System & Network Check" in LockDown Browser, run the checks again prior to the exam
- To produce a good webcam video, do the following:

- Avoid wearing baseball caps or hats with brims
- Ensure your computer or device is on a firm surface (a desk or table). Do NOT have the computer on your lap, a bed, or other surface where the device (or you) are likely to move
- If using a built-in webcam, avoid readjusting the tilt of the screen after the webcam setup is complete
- Take the exam in a well-lit room, but avoid backlighting (such as sitting with your back to a window)
- Remember that LockDown Browser will prevent you from accessing other websites or applications; you will be unable to exit the test until all questions are completed and submitted

Getting Help

Several resources are available if you encounter problems with LockDown Browser:

- The Windows and Mac versions of LockDown Browser have a "Help Center" button located on the toolbar. Use the "System & Network Check" to troubleshoot issues. If an exam requires you to use a webcam, also run the "Webcam Check" from this area
- Respondus has a Knowledge Base available from support.respondus.com. Select the "Knowledge Base" link and then select "Respondus LockDown Browser" as the product. If your problem is with a webcam, select "Respondus Monitor" as your product
- If you're still unable to resolve a technical issue with LockDown Browser, go to support.respondus.com and select "Submit a Ticket". Provide detailed information about your problem and what steps you took to resolve it

Final Examination or Evaluation

There shall be an appropriate final examination and evaluation at the scheduled time as indicated in University calendar, unless specifically exempted by the college dean who has curricular responsibility of the course. The examination is expected to have descriptive, problem analysis and problem solving style questions to answer.

Grading Information

1. Programming assignment carries **20%** towards final score. Average of 8 scores from programming assignments will be contributed.
2. Quizzes carried **30%** towards final score. Average of 6 scores from quizzes will be contributed.
3. Project carries **20%** towards final score.
4. Midterm carries **10%** towards final score.
5. Final carries **20%** towards final score.

Submission is allowed till 11:59 pm on due date. Zero delay tolerance for the submission, i.e. NO late submission is permitted, unless you make special arrangements with your instructor beforehand.

You will receive a numeric score for the midterm, the final, each of the total homework, and each project submission. Letter grade, which is your class grade, will be obtained by adding the numeric scores and weighing with the percentages given below. Fraction in percentage will be converted into nearest integer value ('>= 0.5' will be moved to next integer number, '< 0.5' will be moved to previous integer number).

A+ = 100-97%	A = 96-93%	A- = 92-90%
B+ = 89-87%	B = 86-83%	B- = 82-80%
C+ = 79-77%	C = 76-73%	C- = 72-70%
D+ = 69-67%	D = 66-63%	D- = 62-60%
F = 59-0% Failure		

Classroom Protocol

1. **You must come to class on time!** Students entering the classroom late disrupt the lecture and / or the students already in class who may be engaged in lab or discussion. Late students will not be accepted in class.
2. If you miss a lecture you are still responsible for any material discussed or assignments given. A large portion of each class will be used for hands-on lab / discussion. All students are expected to participate in class activities. Students who are often absent will find themselves at a disadvantage during the tests.
3. No audio / video recording or photography in the classroom without prior permission of instructor.
4. It is individual **student responsibility to check validity** of their homework, assignment, project, submission (format error, blank files, corrupted files, and many more such) and re-submit within deadline if needed. Once the grading is started there will be no consideration for resubmit. **If the submission found to have any logistics issue at grading time (format error, blank files, corrupted files, and many more such) it will be evaluated as 0.**
5. No personal discussion or cell phone activity during class time. Please set the cell phone on **silent/vibrate** mode.
6. All e-mail communication to the instructor must have the subject line start with **[CS47,01]**
7. Email to be sent to the instructor's SJSU email ID (kaushik.patra@sjsu.edu) only.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](#) at <http://www.sjsu.edu/gup/syllabusinfo/>

Course Schedule – *subject to change by instructor with due notice.*

Date	Lecture	Notes
01/23/20	Green Sheet Review	
01/28/20	Introduction to Computer	Submit Prerequisite Survey & Syllabus Agreement (Jan 25)
01/30/20	Computer Organization	
02/04/20	Number Representation	Last date to drop
02/06/20	Programming a computer	Add code will be supplied (Last date to add course Feb11)
02/11/20	Assembler / Linker /Loader	
02/13/20	SPIM simulator	Quiz-01 (Feb 14-15)
02/18/20	Memory Usage I	Programming assignment 1 Submission
02/20/20	Memory Usage II	Programming assignment 2 Submission
02/25/20	Memory Usage III	Programming assignment 3 Submission
02/27/20	MIPS Assembly Language, Arithmetic & Logic Instructions	Programming assignment 4 Submission Quiz-02 (Feb 28-29)
03/03/20	Comparison, branch & jump Instruction	
03/05/20	Procedure Call	Programming assignment 5 Submission
03/10/20	Example 'printf' procedure call	Quiz-03 (Mar 13-14)
03/12/20	Midterm Review I	Programming assignment 6 Submission
03/17/20	Midterm Review II	Programming assignment 7 Submission
03/19/20	Midterm Exam (during your class meeting time)	
03/24/20	Boolean Algebra I	Project is published;
03/26/20	Boolean Algebra II	Programming assignment 8 Submission Quiz-04 (Mar 27 – 28)
03/31/20	Spring Break (Mar 30 – Apr 03)	
04/02/20		
04/07/20	Logic gates	
04/09/20	Logic Circuit Design	
04/14/20	Logic Design Components	
04/16/20	Addition / Subtraction Logic	Quiz-05 (Apr 17-18)
04/21/20	Multiplication Logic	
04/23/20	Division Logic	
04/28/20	Floating Point Number Representation	
04/30/20	Exceptions & Interrupts	Project Submission
05/05/20	Review I	
05/07/20	Review II	Quiz-06 (May 08-09)
05/14/20	Final Exam 5:15 pm – 7:30 pm	